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MONTHLY REVIEW

Published by the

American Electro-Platers Society

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A SOCIETY FOR THE ADVANCEMENT OF THE SCIENCE OF ELECTRO-PLATING

v.7 #10

OCTOBER, 1920

Entered as second-class matter, March 1, 1917, at the Post Office at St. Louis, Mo., under the Act of August 24, 1912

Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized August 12, 1918

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INDEX.

Editorial Notes..... 3
The Application of Science to the Electro-Deposition of Metals*. 4
Ball Burnished Steel and Nickel-Plated Steel..... 7
Oxidization of Aluminum Parts..... 10
A Treatise on Electro-Plating Antimonial Lead..... 12
Mercury Gilding..... 6
What the Branches Are Doing..... 17
News Items..... 24

WISE MEN SAY—

That working will get you farther than whining.

That misery is rust on a mind that has stopped working.

That the smaller the mind, the longer it takes to make up.

That he who lives without folly is not as wise as he imagines.

That the man who never does anything he doesn't like rarely likes anything he does.

That wit should be used as a shield for defense rather than as a sword to wound others.

That it's difficult for a man to keep straight when he's trying to make both ends meet.

That most people would not have so many troubles if they spent less time talking about them.

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Editors' Office, 4156 Botanical Ave., St. Louis, Mo.

Vol. 7 OCTOBER No. 10

EDITORIAL NOTES

On account of the amount of correspondence we receive, it may be due to many of our members to comment briefly on the progress of our Society. Boston, our baby branch, is enthusiastic and is holding interesting meetings and adding to its membership. Toronto is going ahead with renewed vigor, and we expect soon to have a Toronto Number. Cleveland now having a championship baseball club, is putting that kind of spirit in their branch affairs and will soon hold a smoker. Chicago, as usual, are already planning for their big event in February. Bridgeport and Providence-Attleboro are sending reports promptly and will each have a Monthly Review to their credit early in 1921. Indianapolis cannot fail to keep up the reputation of our conventions if they continue at the pace they are now going. New York, Newark, Detroit, Pittsburgh, Grand Rapids, Milwaukee, St. Louis, Cincinnati and Rochester all keep their reports before us, and while we do not have much from Dayton and Toledo, we are confident they are keeping in line. Now, a word for Philadelphia. We commend the interest shown by their going over to Reading to form a new branch and wish them success. All the branches are taking up progressive lines of study or discussions.

During the month we have been asked for information on the assistant foreman amendment referendum. All we can say is to follow instructions sent out by Supreme Secretary. The question as discussed at the convention can be found on pages 7, 8, 9 and 10 of the August "Monthly Review."

Note: Since the above copy was sent to printer our attention was called to an editorial commenting on the assistant foreman amendment, which leads us to this: Nearly every time the subject has been presented by those for or those against the amendment the best intention of the other apparently has been misconstrued. We believe our members are intelligent enough to draw their own conclusions, and that all are interested in the development of our Society, although they may not always agree on methods. We are not afraid of the future of the American Electro-Platers' Society, whether or not this amendment is adopted just now.—Editor.

THE APPLICATIONS OF SCIENCE TO THE ELECTRO-DEPOSITION OF METALS*

This is the first of a series of papers being compiled, entitled "The Applications of Science to the Electro-Deposition of Metals." For that reason, we have chosen to call this one the introduction. In these papers we hope to show the real significance of the scientific control of electro-plating. The sole objects in writing these papers are to set down the most current plating-room troubles, to offer possible remedies for these troubles, and, above all, to pave the road to practical efficiency.

We have all heard a lot about efficiency from a great number of sources. But is it not more or less a rarity to find practical efficiency? What we want is not methods which can be used only in a research laboratory and found impracticable in the plant, but those methods which can be used in our every-day routine, with the results that we get a better product, use less time or less materials, or, better still, all of these.

To this end let us hastily review those most essential elements to which we should turn our attention. In the first place, a plating bath is a chemical solution, and under all conditions it must be treated as such. Chemistry shows us that we have mechanical mixtures and chemical combinations. In the case of a mechanical mixture we might cite the example of finely divided copper filings and pulverized sulphur. Mix them in a mortar, and, after having done so, we can see the different particles of copper and sulphur under a microscope. Further, carbon bisulphide will dissolve the sulphur, allowing the copper to remain. Hence we have nothing here but a mechanical mixture. Now let us heat a portion of this mixture and we will find a new body with entirely different properties will be produced. It is called copper sulphide. This is a case of chemical combination. The only difference in these two is the application of heat in the case of the chemical combination. We have, then, mechanical mixtures which can be separated by mechanical means, and also we have chemical combinations which can only be separated by chemical means. Our plating baths are an example of the latter case. Let us best keep this in mind when handling our plating-room troubles.

A practical working knowledge of chemistry will prove most advantageous to the plater who really understands his profession. He must understand the chemistry involved in his dips. He should understand the analysis of his solutions for the metal content; also for acid strength and impurities. The direct outcome of these analyses will be that he will be in a position to properly control his baths and keep the strength of the required ingredients up to normal. It will enable him to detect the exact trouble in his solution and remedy it without harming the solution itself.

The electro-plater must not only be familiar with his chemistry, but he must also understand the principles of electricity.

*Read at Boston Branch meeting.

The electric current forms one of the most essential elements in electro-plating. The electricity carries the metallic ions from the anode into the solution and thence to the cathode. It is this force which releases the metallic ions and delivers them to the cathode. The proper control of the current density has been found absolutely indispensable in well organized plating. With an understanding of the electric current and care in handling it, other conditions being favorable, it will produce a plate with the required characteristics, i. e., it will be stronger, harder, less porous and brighter. Then, too, the correct flow of current will prevent burning and brittleness.

We have also to consider the proper relation of the anode and cathode surface. This is a point where many platers do not devote enough attention. There are definite relations to the negative cathode and positive anode pole surfaces, and these surfaces should not be allowed to vary except within certain limits, if a product of consistent quality is to be furried out.

Now we come to another field where the plater must use his ingenuity and skill, namely, that of temperature control of solutions. There is an established temperature for every solution, and to maintain this temperature produces the best results. Here the plater must be a careful watcher and have an open eye for the changes which take place due to the changes in temperature.

Anode corrosion is one of the big drawbacks in electro-plating. Here again the plater must be a careful watcher and not allow his anodes to be coated with impurities if he is to obtain the best work from his tanks. We are often deceived by thinking our anodes are clean when they are thickly coated with a partial non-conductor. "No current" troubles can often be traced to this source.

Now we come to the use of the colloidal agents. Colloids are substances with a non-crystalline structure, such as gum, gelatine, albumin, starch, glue. A colloidal solution is really a suspension of minute solid particles. The suspended particles of most colloids carry electrical charges, and for this reason it has been claimed that they are valuable in the plating tank. Also colloids tend to prevent the formation of sediment in the tanks. This is a comparatively new field and cannot be expanded here. All other conditions in the plating tank must be under control before colloids are considered at all.

We have now set down some of the main topics which demand the plater's most careful study, and consist of a review of the main constituents of good electro-plating.

It will be seen that the profession of electro-plating is truly a scientific one. The day of the promiscuous "dumper in" is gone. We must be alert to see the exact troubles, to properly diagnose the case, analyze our difficulties and treat them in a

scientific manner to attain the end—better plating. It has been proven in the past that the plater must know his business or he will be a great loss to his employer. There is only one way for the plater to know his business, and that is by conscientiously applying himself to the study of the underlying principles of his profession.

It has too often been the case that the chemist thought he knew it all and rejected the practical man's ideas. Then, on the other hand, the plater very often disapproved of a chemist working with him because of the greater theoretical knowledge of the chemist. The two must work hand in hand to produce the best results. Let this be our slogan—"Co-operation to increase the production and improve the quality."

H. H. WHITCOMB,
Librarian, Boston Branch.

MERCURY GILDING

By O. J. Bedard, Chicago Branch*

This kind of work is done on the metal parts of marble clocks, candleabras, statuary or any work with a background, either on brass, bronze or copper metals that are not soft soldered, as work of this nature will have to be heated. First of all, before we go any farther, we will have to make the wax, which is composed of the following: Bees' wax, 6 oz.; copper acetate, 2 oz.; zinc sulphate, 5 ozs.; copper scales, 1 oz.; powdered borax, ½ oz.; red iron oxide, 3 oz.; copperas, 1 oz.; lamp black Q. S.

Pulverize all the substances (except the wax), then put it all in a pot with the wax and melt it all together, stirring well. Add enough dry lamp black to it until you have a deep brown color, then set it aside and let it cool.

In preparing the work for plating, clean it well, and give it a light brass plating; then rinse it off well; then plate it in a gold solution composed of about four parts of fine gold to one gallon of cyanide solution. Plate the work in this solution until you have a rich color, then rinse the work off again and plate it in a mercury solution which is composed of 10 gallons water, five pounds cyanide and about two to three ounces of bichloride of mercury, using carbon anodes, using a weak E. M. F. until you have a grey color on the work. Then rinse it off well. Now set the work on a turntable, using a blue gas flame, heating it gently until the mercury has vanished. Let it cool off, scratch, brush it gently and then dry. Now heat the wax mixture up and the work slightly, and paint the hot wax on the work and keep on heating the work gently until the wax flows all over it. Take a piece of cheese cloth and wipe it with an even stroke, leaving the wax in the scroll work as heavy as desired, and let it cool. This class of work does not require lacquering and will not tarnish.

*Read at Chicago Branch meeting.

BALL BURNISHED STEEL AND NICKEL-PLATED STEEL

By R. J. Hazucha, Chicago Branch*

Successful ball burnishing depends entirely on cleaning and plating; for instance, work that has not be thoroughly cleaned and pickled before ball burnishing will oftentimes give much trouble in producing the required finish, especially when burnishing the plated articles. First, you cannot get the proper lustre; and, second, the plating might peel, so that makes cleaning before burnishing the principal factor in burnishing.

The fact that most of the parts that come to the burnishing department come from the punch press department with a lot of mineral oil and lubricating compound on the parts, makes the cleaning problem so much harder, so the first thing the plater has to do is to find a suitable cleaner for his particular class of work. After the parts are thoroughly cleaned, if cold rolled steel, they should be immersed in a 30% solution of hydrochloric acid for about five minutes, rinsed in water and then dipped back into a cleaner, which should be left to dry on the surface of the parts while waiting to be put into the burnishing barrel.

A quantity of parts prepared this way should be on hand at all times, for it will not only neutralize the acid in the pores, but it will help soften the water and also save time when refilling the burnishing barrels. If the parts happen to be made from hot rolled steel or any oxidized material, they should be thoroughly cleaned and pickled until all of the scale is removed and then handled the same as the cold rolled steel, except they should be burnished longer.

Burnishing Before Plating

This is governed by the shape of the parts and the finish required. In order to do good ball burnishing, you must have plenty of steel balls in the barrel, so that the parts will not scratch, but burnish; the time depends entirely on the finish required, and the plater has to standardize the time for the various kinds of parts. Soap chips are extensively used in burnishing barrels, the amount depending on the size of the barrel, the cleanliness of the parts and water. If you use cold water and soap chips, you will find that you have to use a lot more soap chips and leave the work in much longer than if you use water about 150 degrees Fahr. and soft soap.

We are using warm water for burnishing and never fill the barrel to the top, always leaving about two square inches space for soap suds. We also make our own soft soap from soap chips and a very mild cleaner, and where we used a barrel of soap chips a week, we are now using a barrel a month, with 50% more equipment. We simply take a 50-gallon barrel with a steam pipe connected, add 20 gallons of water, 25 pounds of soap chips and 12½ pounds of mild cleaner; then boil till all the

*Read at Rochester convention.

soap chips are dissolved, then fill the barrel full of water and let it cool and set. This sometimes takes 15 hours if the solution is too hot, so it is best to have two such barrels so you can be making one barrel while you are using the other. A scoop holding about a half gallon of soft soap is used to each barrel for each run, so you can see that 25 pounds of soap chips will last for one hundred loads, which you will agree with us is stretching the soap some. Another good feature about the soft soap is that it dissolves in the barrel instantly, and that means lubrication the minute you start running the burnishing barrel.

Plating Work for Burnishing

In plating work that has to be burnished after plating, considerable judgment must be used, especially on work that has to be plated in still tanks. Heavy deposits do not burnish very well, but it is not necessary to have a heavy deposit on burnished work if the parts are properly burnished before plating so that the sharp edges are rounded, because it is a known fact that when we buff an article we remove some deposit, sometimes half of the deposit; so if we deposit a half thousandth of an inch of nickel on a part and then buff half of it off, that only leaves a quarter of a thousandth of an inch, and then we take another part and deposit only one-quarter thousandth of an inch and burnish it, we will obtain a finish that will have a better wearing quality than the buffed part.

Articles plated twenty minutes in a solution that carries eight to ten amperes per square foot of surface will burnish satisfactorily and also have a good deposit. Parts that are plated in a mechanical plating barrel should be plated from thirty to forty-five minutes in a cylinder that does not rotate more than four revolutions a minute. If you exceed this, the work might scratch so that the preliminary burnishing is wasted and the finish of the parts is spoiled. It is very essential that the deposit be soft and bright, because the brighter the deposit the faster it will burnish. After the parts are plated it is a good idea not to dry them, but rinse them in cold water, then in a cleaning solution, and let the cleaner dry on the parts, after which they are ready to be burnished.

Burnishing After Plating

There is no difficulty in burnishing nickel-plated steel if the steel is properly cleaned, burnished and plated; but you must not overload your barrel with work, because it will come out scratched. It is also a good idea to keep a separate set of barrels for nickel-plated work only, because when you put in a load of nickel after steel the first load or two always comes out with a sort of a steel color which is pretty hard to remove and restore to the proper finish.

Drying

Generally drying in tumbling barrels with sawdust is used, which is all right on small and round parts, but where there is

a flat surface and the parts are heavy they will scratch and spoil the finish, so where there is any amount of flat surface parts going through it is best to have a hot sawdust box so the parts can be dried with the least possible handling.

DISCUSSION ON ABOVE PAPER

Mr. Hogaboom: We manufacture those dime savings banks and it is some problem to remove the steel balls from inside of them without handling separately. I think we can study on this. I have not seen anything on the market for separating steel balls.

Mr. Hazucha: We are, at present, putting in 20 barrels in each new plant, and we have a conveyor system in construction which will take the work from the barrels; and the room being 60 feet long, the travel would throw these balls out. It is usually enough, to have a spiral that can do it. We can remove tacks that way, but that takes up considerable room, and it is quite a difficult problem to handle it that way, and it is expensive, because you have to have a jiggle supply.

Mr. Wilson: In regard to striking the balls, I have an arrangement with the sieve part 30 inches in diameter. The sieve being funnel-shaped, the balls come to the bottom, and we take them out from there and throw them back into the burnished barrels. I have eight burnishing barrels and four brass barrels that I burnish brass in. And for the brass parts that are not so highly polished I use a brass barrel, and I get a high finish by tumbling them together.

Q.: What size balls do you use for this class of work?

A. (Mr. Hazucha): We are fortunate in having a class of work that will take 3/16 or 7/32 ball and none of the work nests. I worked for a concern in a hardware factory (and you know you get most anything there), and we had four or five different kinds of balls, and every time we would try to load up the barrel we would have to see whether some of the balls would stick in the holes. We are fortunate on this class of work. In fact, all our work that is burnished is burnished with 3/16 or 7/32.

Mr. Wilson: A short time ago I had a quantity of pencil holders 4½ inches long. One of the men put the work into a burnishing barrel and put in a ball just the size of the holders, so that they fit in there nicely and consequently set there. Of course, I had to scrap the work and the balls.

Mr. Robinson: I should like to ask if his work that he has trouble in separating the balls from would stand shaking?

A.: Yes, it would stand shaking.

Q.: Did you ever try a sieve operated as the sand griddles are operated in a foundry?

A.: Yes; but we carry about 800 pounds of balls and 250 pounds of work, which makes one-half a ton to sieve, because you would have to transfer your balls over.

Mr. Hazucha: I might state for the information of a good many gentlemen who are using the Abbot Machine, I have seen a little stunt on reloading the burnished balls into the barrel. They have a pan that sets under the barrel. We have a moving conveyor that brings it over there. They have a motor connected and it is just like one of those ash receivers which goes up and loads the barrel with steel balls.

Mr. Morningstar: I would suggest that Mr. Hogaboom adopt a vibrating system. We have done considerable work there is tumbling burnishing. I had little boxes made on the same shape, used to run 150 pounds to a barrel, and the trouble was removing the balls. We had to shake them out by hand. We got a rigging that we worked on a vibrator, and the articles would tumble around and the balls would fall through.

Mr. Allen: Mr. Hazucha says it is impossible to handle half a ton of balls in any way. If he will come down to my plant I will show him the apparatus whereby we not only handle those balls, but we separate the balls in the work and also transfer the balls from one end of the row to the barrels at the farther end, and with one man shooting them into the barrel.

Q.: That is mechanical, is it not?

A.: It is merely in the form of some simple apparatus that any man can have made, and with a conveyor track.

Mr. Hazucha: That is mechanical and, of course, you can do it.

OXIDIZATION OF ALUMINUM PARTS

By Frank J. Hanlon of Chicago Branch, A. E. S.*

The writer discovered a lot of data that leads him to believe that the camera industry, through the curtailment of steel to supply our railroads with additional equipment, will be compelled to make a more extensive use of aluminum, both sheet and cast.

Then comes the inauguration of a campaign by the platers to supply an oxidized surface on these new parts to match the brass parts that are oxidized now, and the writer believes that a very good method of procedure will be to first nickel-plate under process of percloride of iron (ferric) two ounces to the gallon of water, then to strike either in acid or cyanide copper, and to then oxidize in regular method of liver of sulphur solution.

It is said by one of our members that a very good black on aluminum is to prepare in the perchloride of iron solution or

* Read at Rochester Convention.

bath and plate in black nickel direct. The writer has tried this method, and, while he did obtain a black deposit, it did not match balance of the brass parts that were oxidized in the regular way of blacking of camera parts, so naturally he felt that the advantage of this method was lost for this particular industry; but the craft can use this method very successfully on individual jobs and obtain some very substantial finishes.

Prior to having used this method the writer used to oxidize cast aluminum instrument cases by immersion in a caustic soda solution consisting of six ounces of sodium hydroxide and one gallon of water heated to boiling point. Then as a final dip to set the color, immerse in perchloride of iron solution (ferric), two ounces to gallon of water heated to about 120° of heat Fahrenheit, and had quite a lot of success this way of doing, but if asked the best way he knew, would prefer the first method mentioned in the paper for practicability, durability and color match.

DISCUSSION

Mr. Speary: By using the iron chloride before transferring into the nickel bath, I found by immersing three or four minutes I did not have any success. But the longer I gave the iron chloride immersion, eight or ten minutes, the better success I had, by coating it with the nickel.

Mr. Proctor: I have recently visited the plant of Mr. Hanlon, and his method of plating aluminum was as follows: He cleansed the aluminum as usual after polishing, and with benzine or gasoline, and then passed through a concentrated solution of soda ash at about 180° Fahrenheit. Then rewash in cold water and immerse in the perchloride of iron dip, two ounces per gallon of water immersing the articles from the iron dip into the nickel solution and plate for the length of time desired.

There was a firm in Toledo plating thousands of hot-water bottles made of aluminum. They had to be nickel-plated and they found they had a difficult job. They explained the difficulty to me. I do not presume to have had any great experience in plating aluminum, but I gave them a method I have used successfully. That was to prepare a mixture of sulphuric and nitric acid of equal parts and take two ounces of perchloride of iron, dissolve that in hot water and add to the combination of sulphuric and nitric acid. Cleanse the aluminum in the usual method. Take it out and wash out and immerse in the dip. Be sure your dip is in circulation and take it and wash it and plate it. I did give a special solution for the nickel, and they found that they could plate in their regular solution. They told me they did not have 1% failure. I asked whether they did not experience any trouble from continuous introduction of the iron. They said they had some trouble when the solution was acid, and that they kept the solution as close to the neutral point as possible.

A TREATISE ON ELECTRO-PLATING ANTIMONIAL LEAD

By C. H. Proctor

Antimonial lead is used extensively in the production of electric lighting fixtures of various types and in many other lines of art metal production.

Commercial antimonial lead is a by-product obtained from the silver mining industry. The alloy usually consists of lead 86 to 88 parts, and antimony 12 to 14 parts. The impurities are usually arsenic. The latter metal, when in excess, usually causes trouble in casting and plating of the metal.

Antimonial lead is somewhat more difficult to plate than the ordinary commercial metals, primarily due to the fact that the metal is more difficult to cleanse, and oxides that form on the metal cannot be removed by usual methods in vogue.

Antimonial lead castings should be preferably plated as soon after casting as possible while they are still bright and free from oxide; considerable labor is thus saved.

Antimonial lead is somewhat soft, so readily lends itself to the usual polishing with cloth buffs and tripoli composition as the cutting medium and white lime composition as the finishing medium.

In cleansing it is advisable to remove excess polishing materials by immersing the articles in benzine or gasoline. At the same time a soft brush should be used to brush the excess of polishing material from the backgrounds, crevices, etc. After cleansing as outlined, dry out in maple wood sawdust.

The articles are now ready for the final cleansing. Some of the commercial cleansers on the market may be used. Many platers, however, prefer to use only caustic soda in preference to any other material. However, a modified solution gives the best results. Such a solution should be prepared as follows:

Water. . ..... 1 gal.
Caustic soda 74%..... 4 ozs.
Soda ash 58%..... 2 ozs.
Sodium cyanide 98%..¼-⅓ ozs. Temp. 180° Fahr.

The antimonial lead castings should be immersed in the hot cleansing solution for only a few seconds, otherwise the metal will be acted upon and turn dark as though oxidized excessively. After cleansing, wash thoroughly in cold water and immerse in a cyanide dip.

Cyanide Dip

Water. . ..... 1 gal.
Sodium cyanide..... 4 to 6 ozs.
and plate in a copper cyanide solution for a basic surface.

Copper Cyanide Solution

Water	1 gal.	
Sodium cyanide	4¼ ozs.	
Copper cyanide	4 ozs	
Bicarbonate of soda	1 oz.	
Hyposulphite of soda	⅛ oz.	Temp. 110 to 120°. At 3 to 4 volts.

Following the preliminary plating in the copper cyanide solution, it is customary to plate in an acid copper solution for heavy deposits. The reason for this is that antimonial lead blisters readily in cyanide copper or brass solutions unless unusual care is used in current control, cleansing, etc.

Acid Copper Solution

Water	1 gal.	
Copper sulphate	1½ lbs.	
Powdered alum	2 ozs.	
Sulphuric acid	3 ozs.	Temp. Normal at 1 to 2 volts. Time of plating ranges

from 10 to 60 minutes, depending on the finish of the article.

After copper-plating in the acid solution, it is customary to bright acid dip the copper-plated surface to produce a uniform, bright lustre over the entire surface, as acid copper deposits are of a matt or dead-toned surface after plating.

The bright acid dip usually consists of the following proportions:

Bright Acid Dip

Nitric acid 38%	1 gal.
Sulphuric acid 66%	1 gal.
Water	1 pt.
Muriatic Acid	1 oz.

The dip should always be kept cold, preferably by surrounding the receptacle with cold running water. The immersion of the copper-plated articles should only be momentary, otherwise the copper deposit will be reduced excessively.

In the production of **Ormolu Gold** finishes, two parts sulphuric acid to one part nitric acid is used. After the copper-plated articles have been acid dipped they are ready for brass or silver-plating. However, the articles should be thoroughly washed in cold water and any **acid stain** should be removed by immersion in the cyanide dip for a moment to remove the stain or oxide. Then re-washed and brass-plated.

Brass Solution

Water.	1 gal.	
Sodium cyanide.....	5½ ozs.	
Copper cyanide.....	3½ ozs.	
Zinc cyanide.....	1¼ ozs.	
Bicarbonate of soda...	1 oz.	
Sal ammoniac.....	½ oz.	Temp. Normal at 3 to 4 volts.

As a brightening agent, one grain of powdered white arsenic may be used, dissolved in two grains of caustic soda and water per gallon of brass solution. The articles should be plated for a sufficient length of time to give the desired brass-plated surface, usually from 10 to 45 minutes.

Silver-Plating

In silver-plating there are two methods in vogue, either by the use of a mercury amalgam or a deposit of nickel as a base for the final deposit of silver.

The first method consists of plating the articles as outlined in the copper cyanide and acid copper solutions and then passing the articles through a mercury or amalgam dip for a moment. This dip gives a thin coating of metallic mercury upon the copper that will prevent deposition of silver by simple immersion, thus preventing the final deposit of silver from peeling and flaking off in the final brushing and finishing operations.

The second method consists of using nickel as a base deposit for the silver in the place of mercury. When such a method is used, then the articles should be plated only in the copper cyanide solution to secure a base deposit of copper; then plated in a nickel solution for 5 to 10 minutes. Following the nickel deposit the usual **Silver Strike Solution** should be used to obtain a rapid basic deposit of silver. It is an advantage to use the **Silver Strike** even when the mercury solution is used in the place of nickel, although satisfactory results can be obtained by plating direct in the regular silver solution.

Nickel Solution

Water.	1 gal.	
Common salt.....	4 ozs.	
Double nickel salts....	8 ozs.	
Citric acid.....	¼ to ½ oz.	Temp. Normal at 2½ to 3 volts.

Mercury Solution — Immersion Dip

Water.	1 gal.	
Cyanide sodium 96/8%.	6 ozs.	
Bichloride mercury....	½ oz	Temp. Normal.

Silver Strike Solution

Water	1 gal.
Sodium cyanide	6 ozs.
Silver cyanide	½ oz.
Caustic soda	¼ oz.

Regular Silver Solution

Water	1 gal.	
Silver cyanide	3 ozs.	
Sodium cyanide	3½ ozs.	
Sal ammoniac 98%	½ oz.	Temp. Normal at 1 to 2 volts.

Gold-Plating: Ormolu Bright Gold, Brush Gold, Etc.

In gold-plating it is necessary to follow out the methods outlined for cyanide copper and acid copper-plating followed by the bright acid dipping, as outlined for **Ormolu Finish,** using the acid dip containing two parts of sulphuric acid to one part nitric acid. Following the acid dipping the articles should be polished or burnished in part, if necessary, recleansed and then **flashed** in the brass solution to obtain a basic deposit for the gold.

The brass solution for this purpose may be less than half the strength given in the formula. What is required is a rapid bright brass surface. When this is obtained gold-plate in the following solution:

Gold Solution

Water	1 gal.	
Sodium cyanide	¼ oz.	
Gold trisalyt	½ oz.	Temp. of solution
Phosphate soda	½ oz.	from 140 to 160° Fahr. at 2 to 2½ volts.

Anodes of the respective metals should be used in the solutions, except the mercury dip, which is an immersion solution.

For antique finishes any of the methods in vogue may be used. For copper and silver, polysulphide. For silver exclusively, platin nig. For brass, black nickel or arsenic and iron solutions, or white arsenic or sodium arsenite dissolved in caustic soda with addition of a little sodium cyanide may be used. The three latter solutions are used as electro solutions.

Anodes of nickel, steel or carbon may be used for the respective solutions. The combinations of barium or the red or yellow antimony sulphides dissolved in caustic soda or potash may be used for brown tones, etc.

All articles should be lacquered to protect the finishes except nickel.

SUCCESSFUL METHODS

Question No. 1. What is the safest way to prepare white metal for nickel-plating?

Answer. Wash in gasoline, dry in hardwood sawdust, rinse in mild alkali cleaner, cold water and put directly into a nickel solution.

Question No. 2. What brightening agent can be used in an 18K gold-plating solution?

Answer. Bisulphite of soda, hyposulphite of soda or pyrophosphate of soda.

Question No. 3. Would it be advisable to silver-plate aluminum reflectors commercially?

Answer. No; furthermore, there is no advantage of making aluminum reflectors as long as they have to be silver-plated.

Question No. 4. In calculating electro-deposits by Faraday law, what percentage of the current used should be figured in depositing metal from cyanide solutions?

Answer. That depends entirely on the efficiency of the solution. All cyanide solutions with the exception of silver operate at a pretty low efficiency.

Question No. 5. Is the specific gravity of water the same at sea level as it is at an altitude of 10,000 feet above?

Answer. The specific gravity is the same as long as the temperature is the same. A difference of opinion arose on this question. We would like to hear from different branches on this question.—**Chicago Branch.**

MA WANTS A CHANGE

"Going away this summer?"

"Guess not. Pa and ma can't agree."

"What's the matter?"

"Pa wants to go somewhere where he can play golf, and ma insists on going to a place where golf has never been heard of."

LOCAL GOSSIP

They say there wuz trouble over to the Bailey's last Tuesday! Missus Bailey, bein' kind of clost and savin', wuz lamentin' and takin' on about her frying pan. There wuz a hole wore clean through it, but she wuz a-pokin' at it. "Seems a shame," sez she. "It's all good but the bottom." And Josh sez, "Wall," sez he, "you're all good but the top, so I should think you and that skillet would get along fust rate."

Josh is layin' kind o' low since.

WHAT THE BRANCHES ARE DOING

Boston

Meets first and third Fridays of each month, 8 p. m., at the Quincy House. Secretary, A. W. Garrett, 37 Dorset St., Dorchester, Mass.

Meeting called to order September 17th, with President Mackie in the chair, with a good attendance. After the regular order of business we elected one applicant to membership. Two applications were received for membership and referred to the Board of Managers. Some time was taken up with the reading of reports from the convention. Much discussion was held regarding the amendment to the Constitution (Part 2, Art. II, Sec. 2), presented at the convention.

Boston Branch met Friday, October 1st, 1920, with the regular order of business. One application for active membership was received and two applicants were elected to membership.

We had a very interesting discussion on the subject: "The Pitting of Nickel Work."

Different answers were given:

Answer No. 1. Hydrogen to the cathode by the use of too much acid in the solution will cause pitting. To overcome this the solution can be neutralized with ammonia.

Answer No. 2. Too much current will cause pitting.

This discussion lasted more than one hour, with every member present getting into it.

Meeting of October 15th called to order with President Mackie in the chair.

A motion was made to appoint a committee to take up question of holding a banquet in February. Mr. Herrick, Mr. Nihan and Mr. Gale were appointed to report at the next meeting.

Mr. Herrick gave a talk on the troubles of lacquer. The difference in the use of good and bad lacquer, and how to get the best results from any kind of lacquer.

A vote of thanks was extended to Mr. Herrick.

One new member was elected.

Bridgeport

Meets third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, Louis J. Maraffi, 744 Hancock Ave., Bridgeport, Conn.

Our September 17th meeting was held in the laboratory with 22 members present, President J. M. Dunn presiding. The committee on general painting and cleaning of the rooms reported progress, and it was voted that this committee continue for another month. A motion was regularly moved and seconded that we take a lease for two years on our rooms, at an increase of $4.00 per month.

It was voted that the chair appoint a committee to act on the referendum vote of admitting assistant foreman platers, and

the following were appointed: Mr. Thompson (chairman), Mr. J. Rall and Mr. E. Maraffi.

We were very much pleased to have with us Mr. Thomas Slattery, now with the Bureau of Printing and Engraving, Washington, D. C., who gave us a very interesting talk on the work carried on there in making up electro-plated plates (¼ inch in thickness) for printing currency. Meeting adjourned at 10:40 p. m.

Our October 15th meeting was held in the laboratory with 17 members present.

It was regularly moved and seconded that the committee on general cleaning and painting of the laboratory be allowed $70.00 to proceed with the painting, etc. The committee on the referendum vote reported progress. Remarks from Mr. Slattery and Mr. Dawson on the referendum vote question.

In discussing the use of hydrofluoric acid in nickel baths, Mr. Slattery stated that in using hydrofluoric acid with different grades of anodes he obtained best results with 98% anodes. Mr. Slattery suggested that some of the boys get around every Friday night and solve problems, etc. It was voted to subscribe for the "Metal Industry" and "Brass World" for one year.

Chicago

Meets second Saturday of each month, 8 p. m., at the Briggs House, Randolph and Wells Sts. Secretary, R. J. Hazucha, 4224 W. 20th St., Chicago, Ill.

Our last regular meeting, held October 9th, was as usual well attended.

We elected one applicant to membership and also received one application.

It was voted that the chair appoint a Banquet Committee of seven to take care of our annual banquet. The following members were appointed: E. Lamoureux, chairman; O. E. Servis, J. H. Hall, H. A. Gilbertson, H. E. Willmore, C. B. Wrout and J. C. Kretschmer.

Under the good and welfare "Polarization" was discussed, and that proved to be a very interesting subject. While we are not yet clear what polarization in solution is, we hope to thresh this subject out at our November meeting.

The librarian had the following questions in his question box (see Successful Methods).

Cleveland

The Cleveland Branch meets every second and last Saturday of the month at 1344 East Prospect St. Secretary B. F. McCormick, 1941 West 77th St.

Regular meeting of our branch was held on September 25th. Plans were discussed for holding a Smoker in the near future. Vote was taken on the assistant foreman amendment and result will be forwarded to Supreme Secretary. With the increase of

our dues to $10.00 per year, we have suspended only five members, and we expect some of these will soon be reinstated. Mr. C. C. Martell of Chicago Branch was a welcome visitor.

Detroit

Meets first Friday in each month at Cass Technical High School, Platers' Classroom, 2nd Avenue and Beech Street, at 8 p. m. Secretary, E. G. Lovering, 635 Grand River Avenue, Detroit, Mich.

Our regular monthly meeting was held October 1st at Cass School with a good attendance, President Kutzen presiding.

Several communications were read and disposed of.

The final vote on the referendum vote on amendment to the Constitution (Part 2, Art. II, Sec. 3) was held over until the November meeting.

A lengthy discussion on baskets, pot racks, etc., for holding shot silver, shot copper and scrap nickel anodes. Mr. Brockway brought to light a form of iron wire baskets used in shot copper solution. General discussion brought out that in using iron or steel wire baskets, the anode corroded better and showed less signs of oxidation, less copper oxide was found and the anode kept brighter, owing to the prussic acid being formed in close proximity to the iron. "Food for Thought." Baskets and racks are being used extensively by Detroit members for anodes and all report excellent results.

Our class at Cass Technical School begins October 11th, and we expect a large enrollment.

Grand Rapids

Meets on the second Wednesday of the month at The Morton House. Secretary, J. B. Hawley, 1317 *Jefferson Ave., Grand Rapids, Mich.*

Grand Rapids Branch called the summons meeting on the regular meeting date for consideration of the amendment relative to assistant foremen. Meeting was called to order, ballots were cast, counted and reviewed.

After adjournment regular meeting was called. Samples of work were shown by Librarian Whalley, Mr. Schultz and President Allen. Finishes shown were in brass, nickel, cyanide zinc and gold-plating.

Mr. Schultz's samples of cyanide zinc deposits attracted most attention and discussion because of their super-excellence.

Methods and finishes were discussed thoroughly and all left expressing satisfaction with the meeting.

A set of by-laws were adopted for the branch and committee discharged.

Report of our Educational Committee of progress in our industrial school arrangements.

Milwaukee

Meets first Friday of each month at West Side Bank Building. Secretary, A. W. Ruttan, 1105 Twenty-eighth St., Milwaukee, Wis.

Our last meeting was well attended. There was quite a discussion in reference to the amendments to the by-laws of the Supreme Society. On motion of the branch a letter is to be sent the members, notifying them that a vote will be taken next meeting.

The Board of Managers was instructed to consider the advisability of having a banquet this winter. The prospects are very promising that one will be held.

Newark

Meets first, third and fifth Fridays of each month, 8 p. m., Foresters' Home, 20 Central Ave., Newark, N. J. Secretary, O. F. Carlson, 225 West Grand St., Rahway, N. J.

The regular meeting of Newark Branch was held at 49 Bank Street, on Friday evening, September 3rd, after a vacation since June 18th, President Sievering in the chair.

There was a good attendance and roll call showed all officers present with the exception of Trustee Matts.

The matter of admitting assistants to membership was discussed at length, and it was voted that the matter be laid over until next meeting and the Secretary be instructed to send special notice to all members.

A communication from the Research Committee was read, asking that the name of ten leading manufacturers in this district be sent them.

Voted that the request be granted.

The committee appointed to secure a meeting place reported that they had secured the use of the old quarters at 49 Bank Street.

A vote of thanks was extended to Mr. Smith for his efforts in securing the place.

Under the head of discussions, Librarian Faint chose the topic, "Pitting On Nickel-Plate." The subject was thoroughly discussed and several remedies suggested, some of a very radical nature. One, for instance, was the use of hydrochloric acid in the nickel solution.

Report of regular meeting held September 17th:

Meeting called to order by President Sievering.

A communication was received from one of our members, Mr. Bert A. Stone, who has accepted a position in Richmond, Va., enclosing one year's dues, and stating he wished to retain his membership in the Newark Branch.

Mr. Stone was one of our best members, always a regular attendant at our meetings, and took an active part in all discussions, and while the members of Newark Branch will miss him, they unite in wishing him the best of luck in his new position.

The result of the referendum vote on admitting assistants

to membership was as follows: In favor of admitting assistants to membership, none; against, 11.

One application for active membership was received and referred to the trustees for action.

Under the head of discussions the following questions were asked:

What should be the metal and cyanide contents in a bright silver solution?

Give a good method of taking "fire" out of silver.

Give a method of securing a white background in the file part of nail files.

Wanted—A bright black or blue oxide on steel which is non-rusting.

After discussing these questions it was suggested that they be published in the "Monthly Review," with a request that members of the various branches answer them, either in the "Monthly Review" or send answers direct to the Secretary of the Newark Branch.

New York

New York Branch of the American Electro-Platers' Society meets every second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York, N. Y. Secretary, John Burke, 110 Glen St., Brooklyn, N. Y.

President Sterling presided at the September meetings of New York Branch of the American Electro-Platers' Society. Three applications for active membership were received and referred to the Board of Trustees. Laboratory Chairman Joseph Haas, Jr., read a list of plating problems to be worked out at the laboratory this winter. Mr. T. B. Haddow exhibited samples of die castings, cold rolled steel and polished steel nickel-plated in a nickel solution containing his magic powder. Advantages gained by adding the magic powder to the nickel solution are rapid deposits, a higher voltage can be employed, anodes keep clean, solution contains no sluge. Solution considered ideal for barrel plating. The following plating problems were discussed:

The cause of silver deposits peeling on nickel deposits, the difficulty of silver-platings, nickel alloydes, stripping silver off die castings, stripping fire coating off silver and the cause of the coating of scale on anodes in a zinc solution.

Philadelphia

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, Philip Uhl, 2432 North 29th St., Philadelphia.

October meeting was well attended, President Metz presiding. In addition to our regular business the committee on open meeting, which will be held in the City of Reading, Pa., October 23rd, 8 p. m., made a favorable report, they having secured the services of Dr. Lukens, University of Pennsylvania; Dr. Taylor

of Mattewan, N. J., and others, who will speak on subjects of interest.

The object of this meeting is to form a branch in Reading, as there is quite a number of platers in that city and vicinity to form a nucleus for a branch.

We expect about 10 or 12 members of this branch to attend the meeting..

Mr. Kirkpatrick has been trying out Lovering's Magic Fluid and showed samples of having a nice finish and good, heavy deposit.

Mr. Royal F. Clark of Bridgeport Branch, now located in Philadelphia, was a visitor. After being heartily welcomed he responded with a talk on the making of phonograph matrixes.

Question asked for a dip to brighten matt glass.

Answer. Use a 10% solution of hydrofluoric acid.

Two applicants were elected and four applications received.

Pittsburgh

Meets every first Saturday at 8 p. m. at United States Bureau of Mines Building, Forbes St. Secretary S. E. Hedden, 227 5th St., Aspinwall, Pa.

Our meeting, held October 2nd, 1920, was called to order by President John Corbit. After the regular business had been taken care of the vote on the amendment to the Constitution was taken, the indication being very much in favor of admitting our assistant plater. As we have not had a complete return from all members, I cannot make a final report as to the total in favor and against. The National Casket Company of Pittsburgh has recently installed a new cafeteria at their plant, and the Pittsburgh Branch has been invited to hold our next meeting there. A lunch will be served, and, while the smokes are being enjoyed we will have some able speakers, who will further entertain those present. After the speakers the plating plant will be inspected, and as a new plant has just been installed, we hope that those present will benefit by the inspection. This meeting will be held November 6th.

Providence-Attleboro

Meets first and third Thursdays of each month at 26 Custom House Street, Room 16. Secretary, Clayton J. Poyton, 269 Ohio Avenue, Providence, R. I.

Providence-Attleboro Branch held their first meeting in September in Providence and the second one in Attleboro. Both meetings were well attended and considerable discussion was heard regarding proposed amendments. We are sending out cards to all members and will no doubt have the vote of all in shortly.

At our second meeting in September we had "White Gold" as the subject for discussion. A number of firms are putting out a white gold product that will not tarnish and will stand acid

test. Our members are interested in duplicating the color by plating. Formulas containing gold, silver, cadmium, nickel and tin in various proportions have been tried, and some very good results have been obtained. Many colorers use nickel to imitate the white gold and in a number of cases the work is satisfactory.

Our initiation fee has been increased to $5.00 and we hope to get some good, active members the coming year.

Our next meeting will be held in Providence, October 7th.

Rochester

Meets on the fourth Fridays. Secretary, Sylvester Gartland, 128 Bryan Street, Rochester, N. Y.

Regular meeting was held October 9th, at Hotel Seneca, with Mr. Raymond Lopez presiding.

The committee on the clam bake, which was held at Rifle Range October 2nd, reported that the "bake" was a grand success.

The champion clam eater was Mrs. John Jordan, wife of the movette operator.

Arrangements to have papers read at our regular meeting were taken up and Mr. Emil Troxler will present the first paper on "Gold Plating and Finishing."

Two applications were received and accepted.

The wives of the Rochester members who assisted so splendidly at the convention have formed an Auxiliary, and the meetings are held the second and fourth Wednesdays of each month. They meet in the homes of the members and each lady acts as hostess. The Auxiliary officers are: Mrs. Ellsworth Fitch, President; Mrs. George Hesselink, Secretary.

The meetings are very enjoyable to the ladies and they serve a dandy luncheon, which I had the pleasure of participating in when I surprised them one evening in the midst of their feast.

Anyone wishing information in regard to the Ladies' Auxiliary please communicate with Mrs. George Hesselink, 242 Bryan Street, Rochester, N. Y.

St. Louis

Meets third Saturday of each month at Barr Branch Library, corner Jefferson and Lafayette. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

The October meeting was called to order by Vice-President C. T. McGinley, as our President, C. L. Weygandt, is doing California. We had a very good attendance and the vote on the assistant plater amendment was taken, the result being one in favor of the amendment and 16 against it.

The subject for discussion was "Cleaning and Pickling of Metals." Papers were prepared by E. W. Heil, H. H. Williams and G. S. Robins, and the questions asked manifested a great interest in our scheduled program for the season. Some questions remain to be answered at the next meeting.

Subject for November 20th is "Copper-Plating," and papers will be prepared by H. J. Dumas and H. J. Richards.

Toronto

Meets second Thursday of each month at Occident Hall, Bathhurst and Queen Streets. Secretary, Chas. Kemish, 271 Boston Avenue, Toronto, Ont.

At the September meeting of the Toronto Branch important business was transacted. All officers being present, which is rather a feature of our meetings. The four applications received at our previous meeting were laid over for balloting on till after the names were published in the "Review." Mr. Acheson was appointed a committee of one to gather material for the "Review," with the purpose of having a number designated as a Toronto Number, as suggested. The proposed amendment in reference to the admitting of assistant foreman platers into the Society will be included in the next notice sent out to our members. President O'Keefe of the Membership Committee has been successful in getting another member in arrears paid up, who went one better by paying a year in advance. The committee as a whole has met with very good results along this line, and it is their intention to continue to keep in touch with each member for the welfare of the Society. Mr. Magill touched on the course to be taken up by the platers' class at the Toronto Technical School during the coming term, which was to be quantitative analysis, followed by organic chemistry, and all members who could were requested to turn out and make a good, strong class, so before this time next month we hope to be well started on the work outlined for us.

ELECTED TO MEMBERSHIP

Boston.

Rudolph T. Marshall.....316 Shrewsbury St., Worcester, Mass.

Chicago.

Walter P. Cummings.....1750 South 27th St., Omaha, Neb
Chas. F. White.....706 Division St., Normal, Ill.

APPLICATIONS FOR MEMBERSHIP

Boston.

John Dranie.....48 Cread St., Worcester, Mass.
Charles H. Morton.....60 Columbus Ave., Waltham, Mass.

Newark.

Andrew Muller (active).....103 Sherman Ave., Newark, N. J.

Philadelphia.

Frank G. Wells (active).....Reading Knob Wks., Reading, Pa.
Maxwell J. Shuck (active)..3809 N. Delki St., Philadelphia, Pa.
Fred E. Shadell (active)..care Fleetwood Metal Body Co., Fleetwood, Pa.
Robt. E. Harrison (associate)—Fourth and Arch St., Philadelphia, Pa.

Rochester.

James A. Carroll (active).....11 Gladys St., Rochester, N. Y.
Ellsworth E. Fitch, Sr., (active)....351 Grant St., Buffalo, N. Y.

Toronto Branch.

Wm. T. Whaley (active)....335 McDonnel St., Peterboro, Ont.
Geo. Lachure (active).....De Laval Co., Ltd., Peterboro, Ont
Niel Hepburn (active)..2821 St. Dominique St., Montreal, Que.
Wm. Jos. Lamb (active).....10 Larch St., Toronto, Ont.